

**ABSTRACT OF THE INVENTION**

A liquid organic, fuel cell is provided which employs a  
5 solid electrolyte membrane. An organic fuel, such as a methanol/water mixture, is circulated past an anode of a cell while oxygen or air is circulated past a cathode of the cell. The cell solid electrolyte membrane is preferably fabricated from Nafion™. Additionally, a method for improving the  
10 performance of carbon electrode structures for use in organic fuel cells is provided wherein a high surface-area carbon particle/Teflon™-binder structure is immersed within a Nafion™/methanol bath to impregnate the electrode with Nafion™. A method for fabricating an anode for use in a organic fuel cell  
15 is described wherein metal alloys are deposited onto the electrode in an electro-deposition solution containing perfluorooctanesulfonic acid. A fuel additive containing perfluorooctanesulfonic acid for use with fuel cells employing a sulfuric acid electrolyte is also disclosed. New organic fuels,  
20 namely, trimethoxymethane, dimethoxymethane, and trioxane are also described for use with either conventional or improved fuel cells.